REMARKS

In the Office Action, the Examiner noted that claims 1-117 are pending in the application. The Examiner noted that claims 1-10 are allowed and claims 11-117 are rejected. Claims 8, 11-37, 41-46, 53-55, 71-73, 89, 93, 97, 101, 105, 108, 109 and 112 have been amended and claims 118-132 have been added by the present amendment, thus, claims 1-132 are now pending in the application. The Examiner's rejections are traversed below.

Claim Objections

At page 2 of Office Action, the Examiner objects to claim 8 indicating that in lines 4, 7 and 11, "detector" should be changed to --detectors--. Claim 8 has been so amended as set forth above. It is respectfully requested that this objection be withdrawn.

Information Disclosure Statement

At page 4 of the Office Action, the Examiner states that the Information Disclosure Statement filed August 1, 2000 fails to comply with 37 CFR §1.98(a)(3) because it does not include for all references the month of publication. The requirements for Publications is found at 37 CFR §1.98(b) and reads as follows. "Each publication shall be identified by the author (if any), title, relevant pages of the publication, date and place of issue." No requirement for a month of publication is found in the regulations. However, Applicants will continue to try to establish a month of publication and will provide such information to the Examiner if the same can be determined.

At page 4 of the Office Action, the Examiner states that the Information Disclosure Statement filed August 1, 2000 fails to comply with 37 CFR §1.98(a)(3) for reference 5 listed in the "Foreign Patent Documents" section because it does not include a concise explanation of

the relevance, as it is presently understood by the individual in 37 CFR§1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English Language. Item 5 as identified by the Examiner appears to be item **BK** as identified on the Information Disclosure Statement of August 1, 2000, i.e. Japan Document 7-506238 dated 7/6/95. Japan Document 7-506238 is a document prepared for the Japanese Phase of a PCT Application corresponding to International Publication Number WO 93/19508 published September 30, 1993. The WO 93/19508 document was provided in an Information Disclosure Statement submitted on September 12, 2000, however it does not appear that the Examiner has considered the WO 93/19508. Enclosed is another copy of WO 93/19508. It is respectfully requested that the Examiner consider the WO 93/19508 document in accordance with the September 12, 2000 IDS and accept the enclosed copy of WO 93/19058 as an appropriate explanation of the relevance of the 7-506238 document included in the August 1, 2000 IDS.

The Rejection

At page 2 of the Office Action, claims 11-117 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,465,039 to Narita et al. The present rejection is based on a single prior art reference. To support a finding of obviousness based on a single reference, the single reference must suggest the desirability of modifying it's disclosure as needed to accomplish the invention. The Examiner has not made a prima facie case of obviousness under the above standard. The Examiner's approach appears to be to provide a brief explanation of the circuitry in Narita et al. and then summarily conclude that it would have been obvious to modify this circuitry in order to arrive at the Applicants' invention. The Examiner has not made any findings of fact as to which portion of the claims as recited read on Narita et al. and how the portions of the claims which do not read on Narita et al. are taught or suggested by Narita et al.

The Prior Art and the Invention

Narita et al. relates to the output characteristics of an AC adapter. Although both an object of Narita et al. and an object of the present invention relate to charging secondary batteries, Narita et al. and the present invention have different methods, means and circuit configurations. The object of Narita et al. is to provide for charging of a built-in secondary battery by providing an AC adapter which is an external power source for an electronic apparatus having a secondary battery in an apparatus such as a notebook computer with three kinds of operation modes in accordance with an operation mode of the apparatus. Particularly, in the case of both operating the apparatus and charging the internal secondary battery simultaneously, Narita et al. intends to shorten a time of charging the secondary battery during the operation of the apparatus by controlling an output of the AC adapter such that the total value of the power consumption of the apparatus and the power for charging the build-in battery becomes a constant power. Then, in the case of both operating the apparatus and charging the build-in secondary battery simultaneously, the apparatus is operated in a constant power mode supplying both a voltage for operating the apparatus and a current for charging the battery. For this purpose, Narita et al. has a control signal for making a selection of an operation for the AC adapter from the electric device side, so as to determine the operation mode of the AC adapter. The present invention does not require a control signal between the electronic apparatus and the AC adapter.

Namely, in Narita et al., in a region B of a graph of Fig. 3 or region F of a graph of Fig. 6, the power for both charging the battery and operating the apparatus is supplied in the constant power mode. However, in Narita et al., as seen from the feedback of a circuit shown in Fig. 1, an AC adapter is designed so that the output characteristics of the AC adapter become as shown in Fig. 3 or Fig. 6, by changing an output of the AC adapter per se, and as a result, the region B of Fig. 3 or region F.of Fig. 6 is realized and thus the power for both charging the battery and operating the apparatus are made to be supplied in the constant power

mode.

A principal difference between Narita et al. and the present invention is that the present invention is adapted to receive power from an external power source, e.g., an AC adapter and supplies the power to both a load and a battery. In such a configuration, the present. invention makes a charging power (or charging current) to the battery variable by controlling a charger so that the sum of the power (or current) supplied to both the load and the battery does not exceed the power value which can be supplied from the AC adapter. That is, all of the controls necessary for charging the battery and for protecting the AC adapter are within the apparatus of the present invention. In Narita et al., variations occur in the voltage available at terminals 28 and 22 in response to a selection signal provided at a terminal 62 of the AC adapter. The apparatus of the present invention is usable with a variety of AC adapters and the ability to protect the AC adapter and does not require feeding information back to the AC adapter in order to affect an operational mode of the AC adapter.

The present invention controls the charger. On the other hand, Narita et al. controls the AC adapter and changes the output of the AC adapter as shown in the graphs of Figs. 3 and 6. Narita et al. discloses a special use adapter, while the present invention discloses the apparatus which receives power from the AC adapter and further discloses how to control the received power within an apparatus. The present invention used in an electronic apparatus, a charger, or a charge control circuit.

Claims 11-25

Regarding claims 11-25, independent claims 11, 16 and 21 have been amended as indicated above.

Regarding claim 11, Narita et al. discloses an electronic device 30 connected to an AC adapter 20, however, Narita et al. does not disclose that the electronic apparatus comprises a charge control circuit for controlling the charging power the charger supplies to the battery so

that a sum of the power applied to the load and the power charged to the battery becomes a value assigned in advance as claimed in claim 11.

The invention as claimed in claims 11-25 is different from Narita et al. in that Narita et al. controls an output of an AC adapter. The present invention controls the charger which receives the output of the AC adapter and then supplies current to the battery.

The Examiner asserts that even though Narita et al. does not specifically mention that the connector receives DC power from the AC adapter, it is considered to be an inherent function of his apparatus in view of component 102, a rectifying circuit. However, the component 102 is an internal component of the AC adapter and does not handle the output from the AC adapter. Therefore, the component 102 does not correspond to a connector connected to the AC adapter, for receiving power from the AC adapter as claimed in the present invention. Also, it is apparent from Fig. 1 that the component 102 operates inside the AC adapter.

Also, the charger of the present invention receives DC power as its input from the AC adapter and supplies the current to the battery. The present invention differs from Narita et al. in this point. Further, such a charger is controlled by the present invention and therefore the present invention differs from Narita et al. in this point as well.

It is respectfully requested that the Examiner reconsider the rejection of claims 11-25 in view of the above remarks and that the Examiner consider the differences between the claimed invention as a whole and the prior art.

Claims 26-34

Regarding claims 26-34, claims 26-34 have been amended as set forth above.

Narita et al. does not disclose that the charging current is controlled such that the charging current becomes equal to or lower than the charging current assigned in advance to the battery. This constituent feature is recited in claim 26 as a charging current detector for

detecting a charging current to the battery; and a control circuit for controlling the charger to generate the charging power so that a sum of the charging power supplied to the battery and the power applied to the load that has been detected becomes a value assigned in advance, and for controlling the charging current based on the detected charging current so that the charging current to the battery becomes equal to or lower than a charging current value assigned in advance to the battery. The Examiner makes no finding as to the presence of this combination of features in Narita et al. Therefore, claims 26-34 are deemed to be patentable over Narita et al.

Claims 35-88

Regarding claims, 35-88, independent claims 35, 36, 37, 53, 54, 55, 71, 72 and 73 have been amended as set forth above.

The present invention is usable with a constant voltage power source. In Narita et al., a supply voltage of the apparatus varies depending on both a voltage of the secondary battery and the power consumption of the apparatus. Therefore, fluctuation of the voltage in Narita et al. is large. The invention as claimed in claims 35-88 uses a the voltage from a constant voltage power source supplying a predetermined voltage as an input. These claims are related to the embodiments of Figs. 10 to 12 of the application. Where the input voltage is a constant voltage power source such as in the Example shown in Fig. 10, the charger is controlled by sensing the input voltage. Where the AC adapter has the capacity to supply the load and to charge the battery, the charging rate of the battery is not affected. However, where the load current increases so as to reduce the input voltage to a predetermined value, the detector which senses the input voltage provides a signal to the charge control circuit to adjust the battery charge current. On the other hand, as explained above, Narita et al. changes the output of the AC adapter by controlling the component mounted inside the AC adapter. Accordingly, Narita et al. differs from the present invention in objects to be controlled.

Claims 89-100

Regarding claims 89-100,independent claims 89, 93 and 97 have been amended as set forth above.

Narita et al. does not disclose that the charging current is controlled so that the charging current becomes equal to or lower than a limit value assigned in advance to the battery. This constituent feature is recited in claim for example in claim 89 as a charging current detector for detecting a charging current to the battery and a control circuit for controlling the charging power the charger supplies to the battery so that a sum of the charging power applied to the load and the power charged to the battery from the power source becomes a value assigned in advance, and for controlling the charging current based on the charging current detected by the charging current detector so that the charging current becomes a limit value assigned to the battery or lower. It is respectfully requested that the Examiner reconsider the rejection of claims 11-25 in view of the above remarks and that the Examiner consider the differences between the claimed invention as a whole and the prior art. The Examiner makes no finding as to the presence of this combination of features in Narita et al. Therefore, claims 89-100 are deemed to be patentable over Narita et al.since Narita et al. does not disclose such a combination of features.

Claims 101-112

Regarding claims 101-112, claims 101, 104, 105, 108, 109 and 112 have been amended as set forth above.

These claims recite an electronic apparatus having an input section and a charger for charging a battery by using power from the input section. The power from the input section operates in a constant voltage mode if the current of the power source is below a predetermined current and the voltage from the power source falls to less than the constant voltage where the power source outputs more than a predetermined current value.

The charging power supplied to the battery from the charger is controlled so that a sum of the power applied to the load and the power to be charged to the battery is substantially in a current range in which the output voltage of the power source is substantially the constant voltage. The feature that the charging power is controlled so that the current associated with the sum of load and charging power does not cause the power source to substantially fall outside the constant voltage region is not disclosed in Narita et al. In Narita et al., the charging voltage varies during the charge in the constant power mode. To be specific, in the constant power mode, as illustrated by the region B of Fig. 3 and the region F of Fig. 6, the charging voltage varies.

Further, in Narita et al., a supply voltage to the apparatus (load) varies depending on both a voltage of the secondary battery and the power consumption of the apparatus. Thus, the voltage applied to the apparatus in Narita et al. varies whereas the voltage applied to the apparatus in the present invention is substantially constant. Accordingly, claims 101-112 are deemed to be patentable over Narita et al.

Claims 113-117

Claims 113-117 recite that a sense resistor for a charge control is used to detect a discharge as well so as to predict a remaining amount of the battery, which corresponds to the embodiment shown in Fig. 3B. These claims represent a generic concept derived from the patented claim 9 and differ from the concept defined by claims 11-112. The Examiner has not provided any evidence as to how claims 113-117 are alleged to be obvious in view of Narita et al. There is no mention in the Office Action about the use of a sense resistor for charge control and the use of the sense resistor to predict the remaining amount of the battery capacity. Such a feature is not disclosed anywhere in Narita et al. Therefore, claims 113-117 are deemed to be patentable over Narita et al.

New Claims 118-129

Claim 118 -129 are deemed to be patentable at least for similar reasons set forth above regarding claims 11-117.

New claims 130-132

Claims 130-132 clearly define a demarcation between the features of the power converter and the electronic apparatus (claim 130), the battery charging apparatus (claim131) and the battery charging control device (claim 132). This demarcation is not obvious in view of Narita et al. In Narita et al., electronic device 30 does not a include a combination of a current comparator to compare a battery charging current with a reference current and to vary a control input based on the comparison of charging current comparator and further does not include a charging voltage comparator to compare a battery voltage with a reference voltage and to vary the control input based on the comparison of the charging voltage comparator. Narita teaches away from the combinations of claim 130-132 by placing the apparatus for controlling charging current within the AC adapter 20. The AC adapter 20 requires an additional input SEL in order to accomplish its function with respect to charging the battery. Such an additional input is not required by the apparatus of the present invention.

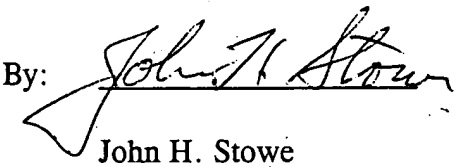
Conclusion

In view of the foregoing amendments, arguments and remarks, all claims are deemed to be allowable and this application is believed to be in condition for allowance.

If any further fees are required in connection with the filing of this Amendment, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY

By: 

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